DOCUMENT RESUME

ED 192 290 CS 005 665

AUTHOR Martin, Joanne; And Others
TITLE The Development of Knowledge Structures. Research Paper No. 557.
INSTITUTION Stanford Univ., Calif. Graduate School of Business.
PUB DATE Sep 80
NOTE 51p.

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Adults; *Cognitive Processes; *Generalization; Higher Education; *Induction; *Knowledge Level; Learning Theories; Reading Comprehension; *Reading Research
IDENTIFIERS Schema Theory

ABSTRACT

A study was conducted to examine the process of the development of knowledge structures concerning events. Specifically, it investigated (1) the ways in which individuals build theories about events as they experience them; (2) the number of events an individual must experience, and how similar those events must be, before he or she begins to generalize about them; and (3) how the content of an event knowledge structure changes as it becomes based on increasing amounts of experience. Eighty-nine graduate students were given descriptions of events to read. The number of events (one, two, three, or four) contained in the stories and the level of their similarity were manipulated. The subjects were asked to write "what happened" in the stories they had read and these responses were then content analyzed. The results showed that subjects exposed to only one event tended to write episodic scripts, with concrete details about the event. Subjects exposed to two or three similar events wrote somewhat more abstract scripts, and those exposed to four similar events wrote the most abstract scripts. Less evidence of generalization was present when subjects read two, three, or four dissimilar events. The findings suggested that the content of inductive theories changes as those theories become based on increasing amounts of supporting evidence. (Author/FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED192290

Research Paper No. 557

THE DEVELOPMENT OF KNOWLEDGE STRUCTURES

Joanne Martin, Wendy Harrod, and Caren Siehl*

September, 1980

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Joanne Martin

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Graduate School of Business
Stanford University

CS 005 665

*This research was conducted while Wendy Harrod was an N.I.M.H. postdoctoral fellow at the Department of Sociology, Stanford University. Caren Siehl is a Ph.D. candidate in the Graduate School of Business, Stanford University. Address all communications to Joanne Martin, Graduate School of Business, Stanford University, Stanford, Cal. 94305. Portions of this paper were presented at the annual meetings of the American Psychological Association, Montreal, Canada, September 1980.

Abstract

The present research examines the process of the development of knowledge structures concerning events. Abelson (1976) suggested that one type of knowledge structure, a script, would move, as similar events were encountered, through three levels of generalization: from episodic, to categorical, and then to hypothetical. Specific hypotheses concerning the content of event knowledge structures at these varying levels of generalization were developed. Subjects were given descriptions of events to read. The number of events (one, two, three or four) and the level of similarity of the events (similar or dissimilar) were manipulated. Subjects were then asked to write "what happened" in the material they had read. Responses to this question were content-analyzed. The results fit predictions. Subjects exposed to one event tended to write episodic protocols, full of concrete details about that event. Subjects exposed to two or three similar events, wrote somewhat more abstract protocols, with many of the characteristics of a categorical script. When exposed to four similar events, subjects' protocols were most abstract, containing some of the characteristics of a hypothetical script. Less evidence of generalization was present when subjects read two, three, or four dissimilar events. The implications of these results were discussed, in terms of how the contents of inductive theories change as those theories are based on increasing amounts of supporting evidence.

The Development of Knowledge Structures

The present research focuses on the structure of knowledge about events. Such event knowledge structures have been conceptualized as frames (Minsky, 1975), schemas (e.g., Rummelhart & Ortony,1977), and scripts (Schank & Abelson, 1977). Theories about event knowledge structures generally have as their premise that people use the personal and/or vicarious experience of an event or events to build theories about what has happened and/or what will happen if a similar event were to occur in the future. To date, relatively little empirical research has examined the process of the development of event knowledge structures.[1] The present research addresses several questions concerning this process: As individuals experience events, how do they build theories about those events? Specifically, how many events must an individual experience, and how similar must those events be, before an individual begins to generalize? How does the content of an event knowledge structure change as it becomes based on increasing amounts of experience?

Nelson and her colleagues have addressed a subset of these questions in their research on the process of script development in children (Nelson, 1979; Nelson & Gruendel, 1979). Their findings indicate that the scripts of older, as opposed to younger, children were less concrete and more complex. Two types of evidence of complexity were found. First, the sequence of elements in the knowledge structure were causally linked with conditional (if...then) terminology. Also, information was clustered hierarchically, so that one or more facts were conceptualized as specific instances of a more general phenomenon. These findings of decreasing concreteness and increasing complexity are relevant to the present study, although our focus is on the development of knowledge structures in adults.

The earliest point at which an event knowledge structure would begin to develop is after exposure to a single event. In reviewing the impact of single, dramatic historical events on later foreign policy decisions, Jervis (1976:221) notes the willingness of decision-makers to build theories based on a single event: "The pressures to apply the lessons learned from one salient situation to others that resemble it are so powerful that even those who are aware of the pitfalls of this experience may succumb." Those "pitfalls" stem from the fact that a description of a single event is based on a single observation, a statistically insufficient basis for generalization.

Like an event, a case example is based on a sample size of one. Research has demonstrated that single case examples impact judgments about category membership, predictions, and attributions (c.f., Borgida & Nisbett, 1977; Kahneman & Tversky, 1973; Martin, in press; Nisbett & Borgida, 1975; Nisbett, Borgida, Crandall & Reed, 1976). This research suggests that the rudimentary elements of a knowledge structure should be present even when knowledge of only a single event is available.

Research has also, however, demonstrated that the impact of information based on multiple observations, such as baserate or consensus information, is strong--often stronger than the impact of case example information (c.f., Ajzen, 1977; Hansen & Donoghue, 1977; Kulik & Taylor, 1980; Manis, Dovalina, Avis, & Cardoze, 1980; Wells & Harvey, 1977; Zuckerman, 1978). This research suggests the hypothesis, congruent with sample size considerations, that knowledge structures based on a single event should show less evidence of generalization than knowledge structures based on multiple events.

In order to test this hypothesis, it is neccessary to conceptualize and measure the level of generalization in the content of a knowledge structure. Abelson (1976) addresses this issue directly. He hypothesizes that one type of event knowledge structure, a script, can occur at one of three levels of abstraction: episodic, categorical, or hypothetical. Abelson does not attempt a systematic analysis of the content differences among these levels. Therefore, the best way to examine the implications of these ideas is to discuss the examples he presents. These examples all involve a child's transgression and punishment script.

The lowest level of abstraction, labeled episodic, is stored in memory as a single episode. Thus, a child might have an episodic script with two events: "The time I stole a cookie" and "boy, did I get spanked."

If the child has multiple experiences of this type, she/he may develop a script at the intermediate level of abstraction, labeled categorical. Abelson's example of the categorical transgression and punishment script consists of two parts: "me doing forbidden things" (under which various transgression episodes, such as stealing a cookie, are collected), which "leads to me getting punished" (under which various punishment episodes are gathered). According to Abelson, then, a categorical script takes the form of a series of general statements, at least some of which are followed by examples of the general concept. These examples are drawn from more than one incident thus melding material from multiple similar incidents into a single script.

The third, and highest level of abstraction, is labeled hypothetical. The hypothetical version of the transgression and punishment script has a complex causal structure:

> Me doing bad things could lead to my getting punished if my parents found out (unless I could make it look like my brother did it), but if it weren't too serious or they were in a good mood, or if I could sweet-talk my mother and she could get around my father, then maybe I'd just get a mild scolding (Abelson, 1976:35)

Thus, according to Abelson, a hypothetical script consists of a string of conditional clauses. Each is stated in general terms without illustrative examples of either "bad things" or types of punishment (with the exception of the concrete reference to getting a mild scolding).

These ideas, concerning the level of generalization of scripts, were used to generate a series of hypotheses. Before presenting these hypotheses, several limitations in the focus of the present research should be noted. The present study focuses on event knowledge structures: as those structures are reflected in language; as that language is written, not spoken; and as those structures are based on vicariously, rather than personally, experienced events. Each of these limitations is discussed below.

Nelson and Gruendel (1979:2-3) draw a useful distinction between "a person's verbal or enactive reconstruction of a common event and the conceptual representation underlying this construction." The surface representation of a knowledge structure, particularly for adults, is likely to be expressed verbally, rather than being enacted. Thus, this surface representation, in language, can be studied. There is a long tradition of research which takes the position that language and thought are inextricably intertwined (e.g., Whorf, 1956). In spite of this research, the extent to which language represents thought is as yet unknown. Similarly, in the context of the present research, the extent to which language

reflects the underlying conceptual representation of the knowledge structure is not known. The study of language should provide, at the least, a view of the surface representation of the knowledge structure and, perhaps, a glimpse of underlying thought processes.

The language studied in the present research is written, rather than oral. The reasons for this limitation are practical. Oral language is prolix and often meandering or casual in its structure. These problems are reduced when people present their thoughts in written text. In the present study a content analysis was performed. The problems inherent in designing and using a complex content analysis scheme are reduced when the text being analyzed is written.

A third limitation of the present research is that we focus on events that are experienced vicariously, rather than personally. Our reasons for selecting vicariously experienced events were practical, in that experimental manipulations were facilitated. Nevertheless, recent research indicates that either knowledge of one's own behavior (self-based consensus information) or knowledge of others' behavior (sample-based consensus information) can affect population estimates and attributions (Kulik & Taylor, 1980).

In the present study, subjects experienced vicariously (by reading descriptions) one, two, three, or four events. When multiple events were presented, those events were either all similar or all dissimilar to each other. After reading about the events, subjects were asked to describe the current state of their knowledge of the events. These written protocols were content analyzed, in order to test the following hypotheses:

1. The overall level of generalization of an event knowledge

structure should be a function of the number of similar events experienced. A knowledge structure based on a single event should be episodic. If two or three similar events have been experienced, the knowledge structure should move towards the categorical level of generalization. If four similar events have been experienced, signs of the hypothetical level of generalization should be present. Less evidence of generalization should be present, if the multiple events experienced are dissimilar.

Restricting attention to knowledge structures based on similar events only, hypotheses two through eight specify how the overall level of generalization should be reflected in the content of the event knowledge structure.

2. The number of general statements in an event knowledge structure should increase with the number of similar events, upon which the knowledge structure is based.

3. In a knowledge structure, the number of examples should decrease as the number of similar events increases. Thus, an episodic knowledge structure should be composed exclusively of examples. A categorical knowledge structure should contain both general statements and, in a hierarchical cluster, examples illustrative of those general statements. A purely hypothetical knowledge structure should contain many general statements and very few, if any, examples.

4. There should be no need for words indicating frequency (i.e., "usually," "in all instances") in a knowledge structure based on

a single incident which occured only once. As the number of similar events increases, the incidence of words indicating frequency, and phrases meaning "in all instances" and "in some instances" should also increase. Conversely, as the number of similar events increases, the incidence of phrases indicating "in one instance" should decrease.

5. The nouns in a knowledge structure can vary in level of abstraction, from names, at the most concrete level, to more abstract words like "individual." The nouns in a knowledge structure should become more abstract, as the number of similar events experienced increases.

6. In Abelson's examples of scripts, the verb tense varies with the level of generalization of the script. The episodic script uses past tense. The categorical script contains a mixture of the "eternal" present tense, used in general statements (i.e., me doing x leads to y), and past tense, used in the presentation of specific examples (i.e., one time I got punished). In the hypothetical script a combination of subjunctive, conditional, "eternal" present, and future tenses is used. As the number of similar events experienced increases, these changes in verb tense should be observed.

7. The number of similar events experienced should affect the types of logical connectors used to link the parts of the knowledge structure. In a knowledge structure based on two or three events, the illustrative examples should be connected to each other with words like "either," "or," (i.e., general statement, followed by "either" example one "or" example two). In Abelson's example of a hypothetical script three logical connectors were used: "if," "then," "unless."

Other logical connectors with similar meanings include "however," "although," "but," "yet." These latter connectors should be used more frequently as the number of similar events, upon which the knowledge structure is based, increases.

Hypotheses two through seven present a fine-grained analysis of how the content of a knowledge structure should change as the number of events, upon which it is based, increases. These hypotheses were derived from the script literature (Abelson, 1976; Schank & Abelson, 1977). This literature does not attempt to present a systematic theory about changes in level of generalization and has, to date, failed to generate much research on this topic. There is, however, a more established tradition of research on changes in the level of abstraction of language. This research has produced at least one well-developed content analysis scheme for coding the level of abstraction of language in children's textbooks (Flesch, 1950). This permits the formulation of the last hypothesis.

8. As the number of similar events experienced increases, the language used in a knowledge structure should become more abstract, as reflected in scores on Flesch's (1950) coding scheme. This last hypothesis postulates congruence between the coding scheme designed to assess the level of generalization of a knowledge structure and a coding scheme designed to measure the level of abstraction of textbooks.

Method

Subjects

A total of eighty-nine M.B.A. students from the Graduate School of Business at Stanford University volunteered to participate in the study. The subjects were given no financial compensation, although all received feedback about the results of the study. Subjects were run in three groups, with 17, 31, and 41 individuals per group.

Procedure

On entering the experimental room, the subjects were told that the study concerned types of stories told by people in organizations. They were asked to read some story materials and then, without referring back to that material, to answer some questions about what they had read. After all subjects had finished the questionnaire, they were debriefed.

Stimulus Materials

The stimulus materials consisted of one or more stories. Each story concerned one event which happened to a particular employee at a specified corporation. Two independent variables were manipulated by varying the content of the event descriptions. The first independent variable was the number of event descriptions (one, two, three, or four). The second independent variable, for subjects reading about more than one event, was the degree of similarity of the events (similar or dissimilar).

The similar events all concerned Mike Balint, an employee of a firm named I.D.E.M. Mike worked in the personnel office, handling employee records. Each similar event involved a second employee of

I.D.E.M., who approached Mike with a request that some potentially damaging personal information in his records not be released by the personnel office. For example, one event involved Bruce Fletcher, a safety engineer. Bruce was concerned about the fact that his medical insurance had paid for a thorizine prescription and some psychiatric tests. Fletcher did not want this information released to a person considering giving him a long-awaited promotion. A similar event involved David Sinclair, a salesman whose wages were garnisheed by an auto repair shop. David had refused to pay for a substandard paint job on his yellow Porsche and feared that reports of his financial problems would hurt his request for a transfer. In each of these similar events, Balint assured the employee that the personal information would not be released. In addition, when someone asked Balint to release the information, he refused to do so.

A random number table was used to assign subjects to conditions and to select the particular stimulus materials for that subject. Similar events were randomly selected from a pool of the four similar events described above, concerning Mike Balint and the classified file information. This pool of events is referred to below as category A. Samples of similar events are presented in Appendix A.

The dissimilar events had the same word length as the similar events, but the subject matter was different. For example, one of the events labeled dissimilar concerned Pete Warren, a beleaguered ombudsman at the Union Story Corporation. Pete had to deal with the insistent complaints of an employee whose office rug had a peculiar and offensive smell. In another event labeled dissimilar, Chuck Graham, a salesman at

United Electronics, desperately wanted a transfer, so he could play with a well-known jazz group in his spare time. Chuck, to the horror of his boss who had refused the transfer, got his way by taking his complaint all the way to the company president.

Although these events were more dissimilar to each other than the events labeled similar, all involved employees of large business organizations. In each, the protagonist was faced with a problem which he attempted to resolve. Thus, although these events are more dissimilar than the events labeled similar, some commonalities are present.

Dissimilar events were also randomly selected from a pool. That pool of potentially dissimilar events consisted of the four category A events described above, four category B events concerning the ombudsman coping with various employee complaints, an event concerning a request for a transfer (category C) and an event involving a retirement (category D). Subjects randomly assigned to recieve dissimilar events received dissimilarity. Samples of dissimilar events are also presented in Appendix A.

Dependent Measure and Content Analysis

The dependent measure was: "What happened in the story material you read?" This wording was selected for two reasons. In contrast to other alternatives, such as "Please summarize what you learned," the selected wording was similar to that used by Nelson(1979). The past tense (happened) was selected in preference to the present tense (happens) in order to reduce pressures to generalize; as stated in hypothesis six, the use of the past tense should be associated with lower levels o

generalization. Subjects were further instructed to "use complete sentences and paragraph form" in their answers. Thus, any differences in content were not due to an avoidance of complete sentences or paragraph form.

The content analysis was performed by a coder blind to the condition to which subjects had been assigned and unaware of the hypotheses of the study. The content analysis procedure required the coder to code separately each sentence of the written protocol. For each sentence,[2] the following were coded:

1. Number of general statements, defined as elements whose referent was to all events.

2. Number of examples, defined as elements whose referent was to a subset, but not all, events.

3. Verb tense, coded as past, present, conditional, subjunctive, or future. If more than one verb per sentence was present, the first verb was coded. Infinitives and gerundives were not coded as verbs.

4. The level of abstraction of the subject of the verb was coded, if possible, into one of four categories, beginning with the least abstract: proper names; job or role titles; the word "employee" or its equivalent; the word "individual," "person," or its equivalent. Other were classified as "other" and were not analyzed further.

In addition to coding the sentences as described above, the coder counted the total number of words in each protocol and the number of words in the categories below.

5. Frequency words were counted, including "usually," "frequently," "some," "many," "more," "less," "fewer," "sometimes," "typically,"

"rarely" and their synonyms. In addition, references to single instances were counted, including such phrases as "for example," "as shown by," "such as." Mixed instances were also counted, including "in x examples," "for x employees," "in several cases." All-inclusive instances were counted, including such phrases as "in all the cases," "in each instance."

6. Logical connectors were counted, including "either," "or," "neither," "nor," "if," "then," "unless," "however," "although," "but," "yet."

In addition, Flesch's coding scheme for the level of abstraction of words in a text was used. That scheme suggests the use of 100-word samples of text. Protocols with less than 100 words were also coded using this scheme. In these cases, a record of this shorter protocol length was retained for use in subsequent analyses. Flesch's scheme, described in detail elsewhere, requires the counting of "definite" words, including: common nouns and nouns with natural gender, finite verbs, present participles ending in ing if used to form the progressive tense, personal pronouns, reflexive pronouns, interrogative pronouns, selected relative pronouns (i.e., "who," "whose," "whom," what," "that"), and selected adjectives and adverbs. A sum of all such "definite" words was calculated for each subject. Thus, Flesch's coding scheme is a global measure, not designed to distinguish among the various aspects of level of abstraction, treated separately in hypotheses two through seven.

Finally, the coder was shown Abelson's examples of episodic, categorical, and hypothetical transgression and punishment scripts.

Using these examples as a guide, the coder was required to code the overall level of generalization of each written protocol. This judgment was made twice. First, the coder classified the protocol into one of four categories: episodic, categorical, and hypothetical-theory, or hypothetical-summary. These first three categories corresponded to those of Abelson. In addition, a less-abstract version of the hypothetical script, labeled hypothetical-summary, was added. A hypothetical-summary script summarized the elements common to all events, with a minimum of examples, but it lacked the complex, conditional structure of Abelson's most highly generalized script. In addition to classifying the protocol into one of these four categories, the coder rated the overall level of generalization of the protocol on a 100-point scale, where 1 = episodic, 50 = categorical, 75 = hypothetical-summary, and 100 = hypothetical-theory.

Results

Coder reliability

Reliability was assessed by having a second judge, blind to experimental condition, code a randomly selected sample of ten protocols. Intercoder reliability measures revealed 99.0% perfect agreement between coders. Winer's (1976: 302-9) analysis of variance technique for assessing reliability yielded an unbiased estimate of .96 reliability.

Overview

The four-category rating of the overall level of generalization of the protocols was reduced to three categories. Hypothetical-summary and hypothetical-theory were merged into a single category.

Only seven subjects wrote protocols at a sufficiently high level of generalization to be coded as hypothetical-theory.

Other content analysis categories were not changed. The data analysis proceeded in two stages. The first stage focused on protocols based on one or multiple similar events. The second stage compared protocols on multiple similar events to protocols based on multiple dissimilar events.

One or multiple similar events

Table 1 contains the means for all the dependent variables for protocols based on one or multiple similar events. These data were analyzed in separate one-way analyses of variance. The independent variable was the number and type of events (one, two similar, three similar, or four similar).

Some content analyses categories were hypothesized to increase or decrease linearly with the number of similar events. These hypotheses were tested by partitioning the linear component of the between-groups sums of squares in the analyses of variance. Other hypotheses specified higher frequencies of some content analysis categories among subjects exposed to two and three, rather than one or four, events. These predictions were tested using planned comparisons with weights of -1, +1, +1, -1, for the one, two, three, and four-event conditions, respectively.[3]

In a preliminary analysis, the total number of words in the protocols was used as a dependent variable. The total number of words did not vary as a function of the number of similar events,

F (3,49) = 1.00, n.s. Thus, none of the results discussed below can be attributed to differences between these experimental conditions in the mean number of words per protocol. Table 2 presents a cross tabulation of the number of similar events by the three-category rating of overall level of generalization.

In accord with hypothesis one, the protocols based on a larger number of events were rated as more general, (Somers' D (assymetric) = .54; Pearson's R = .69, N = 53, $p < .0001$). All 13 subjects who read about only one event wrote a protocol rated as episodic. The protocols of 13 of the 14 subjects who read about two similar events were rated as either categorical (n = 5) or hypothetical (n = 8). Similar results were found for the 13 subjects who read about three similar events, (n = 4 and 8, respectively). Hypothetical ratings (n = 10) were most common among the 13 subjects who read about four similar events.

Results of analyses using the three-category and the 100-point scale ratings of level of generalization were congruent.[4] The latter was used as the dependent variable in a one-way analysis of variance. The linear planned comparison was significant, F (1,49) = 110.85, $p < .0001$. As the number of similar events increased the overall level of the generalization of the protocols, as measured on a 100-point scale, also tended to increase. Thus, the results of the two measures of overall level of generalization were congruent with hypothesis one.

Sample protocols from subjects who read about similar events are presented in Appendix B. The content analysis attempted to specify how the content of these protocols changed as they became more abstract. These data, for subjects who read about one or multiple similar events, are presented in Table 1. In accord with hypothesis two, as the number of similar events increased, the number of general statements also increased. The linear test of this hypothesis was significant, F (1,49) = 73.54, $p < .0001$.[5]

In accord with hypothesis three, as the number of similar events increased, the number of examples cited in the protocols decreased. The linear test of this hypothesis was significant, F (1,49) = 15.31, $p < .0003$. Consideration of the means for both generalizations and examples indicates that, as predicted, subjects who read about a single event relied almost exclusively on examples, those who read about two or three similar events utilized both generalizations and examples, and those who read about four similar events used primarily generalizations.

In accord with hypothesis four, the use of frequency words, such as "usually," increased with the number of similar events, (F (1,49) = 5.66, $p < .03$). Also, as the number of similar events increased, use of phrases meaning "in all instances" increased, F (1,49) = 17.43, $p < .0001$. There was a non-significant trend, in support of hypotheses four, for use of phrases meaning "in several instances" to increase with the number of similar events, F (1,49) = 2.03, $p > .10$.

Phrases meaning "in one instance" were predicted to occur less frequently as the number of similar stories increased. There was a marginally

significant linear trend, F (1,49) = 3.96, $p < .06$, but inspection of the means indicated that the direction of the trend was opposite to that predicted. As the number of similar events increased, use of phrases meaning "in one instance" also increased. Inspection of the protocols indicated the reason for this departure from predictions. Four of the 26 subjects exposed to three similar or four similar events failed to generalize. Their protocols, rated as episodic, tended to use phrases meaning "in one instance" to introduce each separate description of each event. In contrast, subjects exposed to a single event tended to use phrases meaning "in one instance" only once, if ever. Thus, a minority of subjects exposed to three similar and four similar events failed to conform to predictions, producing a linear trend in a direction opposite to that predicted.

To summarize, use of words indicating frequency, and phrases meaning "in all instances," "in mixed instances," and "in one instance" showed a tendency to increase with the number of similar events experienced. For words indicating frequency and phrases meaning "in all instances" these linear trends were significant. With the exception of the results concerning phrases meaning "in one instance" the direction of these linear trends are in accord with hypothesis four.

According to hypothesis five, as the number of similar events increased, the level of abstraction of nouns, particularly those used as subjects of verbs, should have increased. This hypothesis received mixed support. In accord with predictions, the use of proper names decreased as the number of similar events increased, F (1,49) = 4.29, $p < .05$ Also as predicted, the use of more abstract nouns like the word "employee" increased as the number of similar events increased, F (1,49) = 14.85, $p < .0003$. The number of similar events,however, had no siginificant effect on

the frequency of use of job titles or abstract nouns like "individual," $\underline{F}$ (3,49) = 1.62, $p > .10$ and $\underline{F} < 1$, respectively. The latter, most abstract category of nouns was rarely used.

Hypothesis six concerns verb tense changes. Contrary to this hypothesis, no significant effects of number of similar events were found for past tense, $\underline{F}$ (3,49) = 1.24, $\underline{p} > .10$, present tense, $\underline{F}$ (3,49) = 1.66, $\underline{p} > .10$, or the combination of future, conditional, and subjunctive tenses, F (3,49) = 1.10, $\underline{p} > .10$. Inspection of the means indicates that the subjects relied mostly on the past tense, and occasionally on the present tense, irrespective of the number of similar events.

Hypothesis seven is concerned with changes in the logical connectors used to connect clauses of sentences in the protocols. It was predicted that subjects exposed to two or three similar events would be more likely than subjects exposed to one or four similar events, to use the following logical connectors: "either," "or," "neither," "nor." The planned contrast did not support this prediction, $\underline{t}$ (35) = 1.08, $p > .10$, although the trend was in the predicted direction. Based on Ableson's formulation of the hypothetical script, it was predicted that use of the logical connectors "if," "then," and "unless" would increase with the number of similar events. Again, no significant differences were found, $\underline{F} < 1$. This latter group of logical connectors was expanded to include synonyms: "but," "yet," "although," and "however." Again, no significant differences were found, $\underline{F} < 1$. For both of the groups of logical connectors hypothesized to occur most frequently in the hypothetical protocols, the trend was in the predicted direction.

The final hypothesis utilized Flesch's scheme for coding the level of abstraction of language. In accord with predictions, subjects exposed to more similar events used more abstract language. The linear comparison testing this hypothesis was significant for samples of 100 words (Flesch's recommended minimum), F (1,49) = 5.99, $p < .02$, and for samples of 100 words or less, F (1,49) = 5.80, $p < .02$.

Dissimilar versus similar events

This second phase of the data analysis excluded protocols of subjects exposed to a single event. Protocols based on dissimilar events were contrasted to protocols based on similar events. Two separate two-by-three analyses of variance were conducted. The first independent variable was the level of similarity of the events (similar or dissimilar). The second independent variable was the number of events (two, three, or four).

In the first of these analyses the dependent variable was total number of words per protocol. There was a marginally significant main effect for level of similarity, F (1, 75) = 3.15, $p < .08$. Those who read about dissimilar events wrote slightly longer protocols than those who read about similar events. The main effect for number of events had no significant main effect, F (2,75) = 1.54, $p > .10$. The interaction between level of similarity and number of events was marginally significant, F (2,75) = 2.59, $p < .09$. Student-Neuman-Keuls comparisons indicated no significant differences among the six means. Thus, the results of the subsequent analyses cannot be attributed to differences in the length of protocols.

The three-category ratings of overall level of generalization are presented in Table 3, for subjects exposed to dissimilar events only. As the number of dissimilar events increased, the protocols were rated as having a higher level of generalization, Somer's D (assymmetric) = .32; Pearson's R = .40, N = 35, $p < .01$.

Of the 13 protocols based on two dissimilar events, 11 were rated as episodic. Of the 13 protocols based on three dissimilar events, nine were coded as episodic. Of the protocols based on four dissimilar events, three were coded as episodic. Thus, 23 of the 35 subjects exposed to dissimilar events conformed to predictions and wrote protocols rated as episodic.

A minority of these 35 subjects failed to conform to predictions. Instead they wrote protocols based on dissimilar events that were rated as showing evidence of generalization. Indeed, eight subjects exposed to dissimilar events wrote highly generalized protocols which were rated as hypothetical.

This same pattern of results is reflected in the two-by-three analysis of variance of the 100-point scale rating of the overall level of generalization. In this analysis, a significant main effect was found for the level of similarity of the events, (F (1,75) = 32.99, $p < .0001$. As predicted, protocols based on similar events were rated as more generalized than protocols based on dissimilar events. There was also a significant main effect for the number of events, F (2,75) = 3.49, $p < .04$. The level of generalization increased with the number of events. The interaction between level of similarity and number of events was marginally significant, F (2,74) = 2.48, $p < .10$. Examination of the cell means clarifies these findings. Subjects exposed to two dissimilar, M = 14.15, and to three dissimilar events, M = 26.77,

wrote significantly less generalized protocols than subjects exposed to four dissimilar, two similar, three similar, and four similar events, $\underline{M}$ = 52.44, 65.00, 60.85, and 69.23, respectively, (Student-Newman-Keuls, $\underline{p} < .05$).

These results fit predictions with one exception. It was not expected that subjects exposed to four dissimilar events would be so willing to generalize about those events, yet clearly some of these subjects did so. These results raise a question: how can one generalize about events which are dissimilar? Appendix C contains samples of hypothetical protocols based on dissimilar events. As these samples indicate, those subjects who did attempt to make generalizations about three or four dissimilar events were forced to a high level of abstraction, in order to find a conceptual link among these dissimilar stimuli. With the exception of the results for this minority of the subjects, results from the second stage of the analysis found, in accord with predictions, significantly less evidence of generalization among subjects exposed to dissimilar, as opposed to similar, events.

Discussion

The present study was designed to address two specific questions about the development of knowledge structures. How many events must be experienced, and how similar must those events be, before an individual begins to generalize? And secondly, how does the content of an event knowledge structure change as it becomes based on increasing amounts of experience?

The results from subjects exposed to one or multiple similar events are discussed first. In accord with hypothesis one, as the

number of similar events increased, the ratings of the overall level of generalization also increased. All of the subjects exposed to a single event wrote protocols coded as episodic. There was no evidence that these subjects "succumbed to the pitfalls" of generalizing from a single event. Exposure to two similar or three similar events was sufficient to trigger the process of generalization, as only two of these 27 subjects wrote protocols coded as episodic. The subjects exposed to four similar events showed even more evidence of generalization, as their protocols were predominantly hypothetical. In summary, the process of generalization began, for these subjects, after exposure to two similar events--one event was not sufficient.

In accord with hypotheses two and three, as the number of similar events increaed, the number of general statements increased and the number of examples decreased. Thus, subjects exposed to a single event wrote protocols composed primarily of examples, with few, if any, general statements. This corresponds closely to Abelson's example of an episodic script. In the protocols based on two or three similar events, general statements were followed by illustrative examples. This closely corresponds to Abelson's definition of a categorical script. These results are also congruent with Nelson and Gruendel's (1979) finding that older children tended to cluster information hierarchically, using facts as specific instances of a more general phenomenon. The protocols of subjects exposed to four similar events were, as hypothesized, composed primarily of general statements rather than specific examples. As discussed more fully below, these protocols fit some, but not all, aspects of Abelson's definition of a hypothetical script.

Hypothesis four received mixed support. In accord with that hypothesis, as the number of similar events increased, the use of frequency words and phrases meaning "in all instances" also increased. Use of phrases meaning "in mixed instances" showed a similar, but not significant, trend in the predicted direction. Use of phrases meaning "in one instance" also showed a marginally significant tendency to increase with the number of similar events, but the direction of this latter trend was opposite to that predicted. Thus, all words and phrases indicating frequency showed some tendency to increase with the number of similar events.

Hypothesis five, concerning the level of abstraction of nouns, also received mixed support. As predicted, use of the least abstract noun category, proper names, decreased as the number of similar events increased. Also as predicted, use of abstract words such as "employee" increased as the number of similar events increased. No significant differences in the other two categories of nouns were noted. Independent of the number of similar events,nouns indicating job titles were frequently used and abstract nouns, like the word "individual" were virtually never used.

Hypothesis six received virtually no support. Subjects exposed to one or multiple similar events tended to rely on past and present verb tenses, not utilizing the future, subjunctive, and conditional verb tenses hypothesized to occur at higher levels of generalization.

Because most sentences in the protocols had one clause, logical connectors were seldom needed to link multiple clauses. Thus, tests of the seventh hypothesis were difficult to make. There were non-significant

trends in the predicted directions. Subjects exposed to two similar and three similar events showed a slight tendency to use logical connectors such as "either" and "or" more frequently than subjects exposed to one or four similar events. Subjects exposed to four similar events showed a slight tendency to use the logical connectors "if," "then," "unless," "but," "yet," "although," and "unless" more frequently than subjects exposed to one, two similar, or three similar events.

In accord with hypothesis eight, as the number of similar events increased, the language in the protocols became increasingly abstract, as indicated by Flesch's global coding scheme for level of abstraction of textbooks. Thus, the more detailed results of the content analysis described above were congruent with results from a more global measure of level of abstraction.

In summary, as the number of similar events increased, the content of the protocols based on those events changed in the following ways: more general statements were made, fewer examples were used, use of words and phrases indicating frequency showed some tendency to increase, nouns showed some tendency to become more abstract, and, overall, more abstract language was used. No significant differences in the use of verb tenses or logical connectors were found.

The hypothesized changes in the content of the protocols were derived from Abelson's examples of episodic, categorical, and hypothetical scripts. The results provide considerable support for these formulations, with one exception. Even the subjects exposed to four similar events showed little evidence of the highest level of generalization, as represented by Abelson's example of a hypothetical script. Instead of a complex causal structure, linked by conditional summaries, most of the highly generalized protocols based on similar events were

simple summaries. This lack of highly generalized protocols may have caused some failure to find support for hypotheses concerning nouns, verb tenses, and logical connectors. These hypotheses were difficult to test, because so few subjects exposed to multiple similar events used the highly abstract nouns, the subjunctive, or conditional verb tenses, or the logical connectors hypothesized to occur most frequently in Abelson's version of the hypothetical script. Had subjects written more highly generalized protocols, the direction of the trends suggests that some, if not all, of these hypotheses might have received stronger support.

However, what is surprising about the results of the present study is the extent, not the lack, of willingness to generalize. Exposure to only two similar events was sufficient to start the process of generalization. Moving to a discussion of the data from subjects exposed to dissimilar events, a tendency to generalize was even present among a minority of these subjects. Indeed, subjects exposed to four dissimilar events were as willing to generalize as subjects exposed to multiple similar events.

This latter finding is particularly surprising. The dissimilar events were different in many important ways. Highly generalized theories about these dissimilar events were "built out of air," rather than out of obvious commonalities among the events. Not unexpectedly therefore, the content of these highly generalized theories based on dissimilar events varies considerably, as can be seen in Appendix C. Although dissimilar events were less likely than similar events to trigger the process of generalization, a minority of subjects were willing to build theories based on dramatically different events.

The results of the present study, however, have to be interpreted in light of its design. Had the number of events been increased beyond four, it is possible that more highly generalized responses would have been found. It is possible that the form of these more highly generalized responses could have resembled the complex, conditional structure of Abelson's hypothetical script. Had the events been experienced personally rather than vicariously, the subjects may have been more willing to generalize. It is possible that, had the responses been oral rather than written, the content of the language might have been different. The limitations of the design, discussed in the introduction of this paper, provide some directions for future research.

Reference Notes

1. Nelson, K. Children's long-term memory for routine events. Paper presented at the meeting of the American Psychological Association, New York, September 1979.

2. Nelson, K., & Gruendel, J. M. From personal episode to social script: Two dimensions in the development of event knowledge. Paper presented at the biennial meetings of the Society for Research in Child Development, San Francisco, March 1979.

3. Smith, E. E., & Medin, D. Representation and processing of lexical concepts. Paper presented at the Sloan Conference, University of California, San Diego, March 1979.

References

Abelson, R.P. Script processing in attitude formation and decision making. In J.S. Carroll & J.W. Payne (Eds), Cognition and social behavior. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1976.

Ajzen, I. Intuitive theories of events and the effects of base-rate information on prediction. Journal of Personality and Social Psychology, 1977, 35, 303-314.

Borgida, E., & Nisbett, R. E. The differential impact of abstract vs. concrete information on decisions. Journal of Applied Social Psychology, 1977, 7, 258-271.

Cantor, N., & Mischel, W. Prototypes in person perception. In L. Berkowitz (Ed), Advances in experimental social psychology. New York: Academic Press, Vol. 12, 1979.

Flesch, R. Measuring the level of abstraction. Journal of Applied Psychology. 1950, 34, 384-390.

Hansen, R. D., & Donoghue, J. M. The power of consensus: Information derived from one's and others' behavior. Journal of Personality and Social Psychology, 1977, 35, 294-302.

Jervis, R. Perception and misperception in international politics. Princeton: Princeton University Press, 1976.

Kahneman, D., & Tversky, A. On the psychology of prediction. Psychological Review, 1973, 80, 237-251.

Kulik, J. A., & Taylor, S. E. Premature consensus on consensus? Effects of sample-based versus self-based consensus information. Journal of Personality and Social Psychology, 1980, 38, 871-878.

Manis, M., Dovalina, I., Avis, N. E., & Cardoze, S. Base rates can affect individual predictions. Journal of Personality and Social Psychology, 1980, 38, 231-248.

Martin, J. Stories and scripts in organizational settings. In A. Hastorf & A. Isen (Eds.), Cognitive social psychology. New York: Elsevier North-Holland, Inc., in press.

Minsky, M. A framework for representing knowledge. In P. H. Winston (Ed.), The psychology of computer vision. New York: McGraw Hill, 1975.

Nisbett, R. E., & Borgida, E. Attribution and the psychology of prediction. Journal of Personality and Social Psychology, 1975, 32, 932-943.

Nisbett, R. E., Borgida, E., Crandall, R., & Reed, H. Popular induction: Information is not always informative. In J. W. Carroll & J. W. Payne (Eds.), Cognition and social behavior. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1976.

Rosch, E., Mervis, C. B., Gray, W. D., Johnson, D. M., & Boyes-Braem, P. Basic objects in natural categories. Cognitive Psychology, 1976, 8, 382-439.

Rummelhart, D. E., & Ortony, A. The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N. J.: Lawrence Erlbaum Associates, 1977.

Schank, R., & Abelson, R. Scripts, plans and knowledge. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Wells, G. L., & Harvey, J. J. Do people use consensus information in making causal attributions? Journal of Personality and Social Psychology, 1977, 35, 279-293.

Whorf, B. L. Language, thought, and reality. New York: Wiley, 1956.

Zuckerman, M. Use of consensus information in prediction of behavior. Journal of Experimental Social Psychology, 1978, 14, 163-171.

Footnotes

[1]A number of researchers have examined the process of abstraction of basic objects and person prototypes (Cantor & Mischel, 1979; Rosch, Mervis, Gray, Johnson & Boyes-Braem, 1976; Smith & Medin, 1979). This research suggests that an intermediate level of abstraction is functionally most useful, less abstract categories being too specific and more abstract categories being insufficiently precise for most purposes. It is not clear what the implications of the results of this research, on levels of abstraction of nouns, are for the process of developing knowledge structures about sequences of events. In addition, the issue of functionality is beyond the scope of the present studies.

[2]The first 23 sentences in each protocol were coded. Additional sentences were counted, but not coded.

[3]Since the hypotheses specify the direction of the effect, one-tailed t-tests are reported. When the Bartlett-Box test indicated that the variances were not homogeneous, the t-test was based on separate variance estimates. There is therefore some variation in the degrees of freedom in these latter tests.

[4]Considering data from subjects in all conditions, there was a strong positive association between the three-category and the 100-point scale ratings of level of generalization, (Somers' D (symmetric) = .92. Pearson's R = .98, N = 88, $p < .0001$).

[5]Cell entry(ies) close to absolute zero may make the results of this and subsequent analyses of variance unstable. The pattern of mean differences, however, shows clear evidence of linear trends in the predicted directions.

Table 1

Changes in Protocol Content as a Function of the Number of Similar Events

	Number of Events			
	One	Two Similar	Three Similar	Four Similar
	(n=13)[c]	(n=14)	(n=13)	(n=13)
Dependent variable means:				
Total number words per protocol	173.15	135.71	180.54	161.39
Overall level of generalization[a]	1.69	65.00	60.85	69.23
Number of general statements	0.00	4.07	5.77	6.62
Number of examples	9.08	1.86	4.23	1.31
Frequency words	0.00	0.00	0.08	0.31
Phrases indicating frequency:				
In all instances	0.00	1.57	1.85	2.39
In several instances	0.00	0.00	0.08	0.15
In one instance	0.08	0.36	1.85	0.85
Level of abstraction of nouns:				
Proper names	3.08	0.71	2.00	0.69
Job titles	0.85	0.50	0.62	1.46
"Employee(s)" and synonyms	0.23	0.71	1.62	1.92
"Individual(s)" and synonyms	0.23	0.36	0.23	0.39
Verb tenses				
Past	6.08	4.43	5.39	6.69
Present	2.69	1.14	3.69	0.54
Conditional subjunctive and future	0.31	0.29	0.77	0.46
Logical connectors				
Either, or, neither, nor	0.23	0.71	0.69	0.62
If, then, unless	0.31	0.29	0.31	0.46
If, then, unless, but, yet, although, however	0.69	0.71	0.53	0.85
Level of abstraction[b]				
100-word samples	0.36	0.33	0.31	0.30
Samples of 100 words or less	0.37	0.32	0.32	0.30

[a]As rated on a 100-point scale, where 1 = episodic, 50 = categorical, 75 = hypothetical-summary, and 100 = hypothetical-theory.

[b]Coded using Flesch's (1950) scheme.

[c]Numbers per cell may vary slightly, due to missing data for a particular dependent variable.

Table 2

Number of Similar Events by Three-Category Classification of Level of Generalization

	Number of Events				
	One	Two Similar	Three Similar	Four Similar	Row Total
Level of Generalization					
Episodic	13	1	1	0	15
Categorical	0	5	4	3	12
Hypothetical[a]	0	8	8	10	26
Column Total	13	14	13	13	53

[a]Combines hypothetical-summary and hypothetical-theory.

Table 3

Number of Dissimilar Events by Three-Category Classification of Level of Generalization

Level of Generalization	Number of Events: Two	Three	Four	Row Total
Episodic	11	9	3	23
Categorical	1	1	2	4
Hypothetical	1	3	4	8
Column Total	13	13	9	35

Appendix A: Sample Stimulus Materials

Category A

Mike Balint had been in a meeting all afternoon. As he walked down the hall back to his office, he ran into an old acquaintance of his, Bruce Fletcher. Fletcher and Balint had both moved to Chicago and joined the manufacturing and wholesaling firm, IDEM, the same year. Fletcher was hired as a safety engineer, and Balint worked in the firm's personnel office with employee records. Fletcher walked into the personnel office with Balint, saying he'd like to have a look at his file. Balint pulled the file, had Fletcher sign the check-out sheet attached to it, and offered him a cup of coffee.

Forty minutes later, Fletcher returned the file and looked so disturbed that Balint asked him if anything were wrong. Fletcher said he was afraid that anyone who saw his file would think he was a lunatic. He certainly had a little trouble sleeping and some bouts with depression, but there wasn't anything seriously wrong with him. He would never have allowed the company's group medical insurance to pay for the initial diagnostic tests his psychiatrist had recommended or for the thorizine prescription if he'd known that a record of this payment would become a part of his permanent file. Fletcher said he's applied for the safety manager position in IDEM's new San Jose branch, but now only hoped he still had time to withdraw his application before the recruitment team got a chance to look over his records.

Balint immediately assured Fletcher there was nothing to worry about. Since Congress passed the Privacy Act in the mid 70's, IDEM had followed the policy of classifying employee files. The company had two, separate sets of employee records. A file containing job-related information would be available to the recruitment team evaluating Fletcher's qualifications for the manager position. But Fletcher's other file containing personal information was available only to members of the personnel office and to Fletcher himself. No-one in the personnel office was allowed to give out any information kept in this file without Fletcher's written permission. Balint made sure Fletcher understood this policy and no longer worried about he record of his psychiatric treatment.

A month later, however, Balint got a long distance phone call from a man who introduced himself as William Stendhal, the IDEM field representative for the San Jose area. Stendhal said that he's interviewed an employee of IDEM's Chicago office a couple of days ago, a Bruce Fletcher, and was calling to check on some information about him. Standhal explained that Fletcher's training and experience were right for the job, but his behavior during the interview had been unaccountably awkward and evasive. When asked his reason for wanting to leave the Chicago position, Fletcher had said that he found the Midwest depressing. All this lead Stendhal to suspect that Fletcher had some personal problems he didn't want to discuss, problems which might impair his performance in the safety manager position. Stendhal asked Balint if he would look through Fletcher's file and give him some idea of what these problems might be. Balint winced at the thought of his friend blowing the interview. He told Stendhal he could not be of any help. Even if he had any information of that sor company policy would not allow him to pass it on without Fletcher's written permission. Stendhal crisply thanked Balint and hung up.

Balint didn't really keep in touch with Fletcher. But that December, Balint got a Christmas card from Fletcher saying that he's enrolled in a stress management class given at one of the local community colleges, and was thinking of installing a hot tub in his backyard.

Category A

8:07 Monday morning, the coffee hadn't been made, Mike Balint hadn't found a place to hang up his wet coat, but already someone was standing at the desk waiting to be helped. Balint was responsible for employee records in the personnel office of IDEM, a large manufacturing and wholesaling firm in Chicago. The person standing at the desk was a salesman for IDEM named David Sinclair, who said he wanted to look at his file. Balint asked Sinclair to show some identification and to sign a check-out sheet that was kept with the file. Pointing to the office's seating area, he told Sinclair not to take his file from the room.

Within a matter of moments, Sinclair returned to Balint's desk, extremely angry. Sinclair complained that the records in his file presented a misleading account of his financial situation. It was true that Grand Avenue Body shop had garnisheed his wages, but that happened only because he had refused to pay them for a below standard paint job on his yellow Porsche. There were paint drips left on the fenders. Sinclair said that he was interviewing next month for the director of sales research position that opened up at IDEM's Los Angeles branch. How was he supposed to present himself as a viable candidate for that position if his records made him look like an irresponsible spendthrift?

Balint, as soon as he could get a word in edgewise, said that Sinclair had no reason to be angry. He reminded the salesman that since 1974 when Congress passed the Privacy Act, IDEM had followed the policy of classifying employee files. The company actually kept two, separate sets of records. Company officers in charge of making the sales research appointment would have access only to Sinclair's job-related file. The file with personal information was available only to members of the personnel department, and to Sinclair himself. Furthermore, one could not give out information from his personal file without Sinclair's written permission. Balint noticed the relief in Sinclair's expression and was glad to clear up the problem so easily.

Later that week, however, Balint got a phone call from an old friend of his in the sales division, Joe Rundle. Rundle explained that one of his salesmen, David Sinclair, was being considered for a research position and needed Rundle's recommendation. Rundle privately suspected that Sinclair was not really interested in that kind of a job, that he had been living well beyond his means, and that he had applied for the job only because it would offer him an immediate salary increase and a way out of some crazy financial scrape. Rundle admitted that he had not real evidence though, and wondered if Balint would do him a favor. Would Balint have a look through Sinclair's file, and simply tell Rundle whether or not his suspicions were correct. Balint, of course, recognized the name and remembered the garnishment. Balint said that he was sorry he couldn't be of help, but the personnel office just didn't do things that way. They talked for a short while, and Balint could tell that Rundle was miffed by the sound of his voice.

Balint never really knew what because of Sinclair or the Los Angeles position. But four months later, when Balint was parking his car in the IDEM lot, he pulled up next to a pale yellow Porsche with a For Sale sign in its rear window. Balint shook his head, smiled, and wondered if it was Sinclair's car.

Category B

Union Story's building maintenance crew had come over at once. They had fixed the leaking pipe and mopped up most of the water. But that was two weeks ago, and Bill Gardner's office still had a large water stain on the wall and an unpleasant synthetic odor coming from the damp carpet. Gardner was a financial analyst for Union Story Investor's Diversified Service Corporation in Minneapolis. He had put up with the smell for the past two weeks, and that morning felt he couldn't stand it another day; he had a headache, couldn't concentrate, and was afraid that the padding underneath the carpet would remain damp, rotting and smelling, all winter long. He just had to do something about it.

Gardner called his boss, Stan Woodruff, and explained the problem. He told Woodruff that the carpet and padding had been ruined and needed to be completely replaced. He asked Woodruff to prepare a maintenance request and do what he could to get the crew working on it immediately since the smell was driving him crazy. Woodruff was very understanding. He predicted that the maintenance department would claim not to have enough money to replace the carpet and pad, but Woodruff said he had some friends in that department and he'd see what a little arm twisting could accomplish.

Three mornings later, however, Gardner opened the door to his office and found that the synthetic odor had been compounded by the cloying smell of a cheap air freshener. Gardner called the maintenance department to ask whether they really thought a dousing of air freshener would substitute for a new carpet, but was told by the head of the crew that they'd had a request for an air freshener and had never heard anything about a new carpet.

Gardner stormed down to Woodruff's office and complained bitterly. Woodruff was surprised at Gardner's emotion and told him there was really no need for such theatrics. The smell would probably dissipate and become hardly noticable in just a couple of days. At that point, if Gardner's nose was still sensitive enough to be bothered, he might consider renting one of those portable rug shampooers from a grocery store. Woodruff said he and his wife had rented one when they moved their daughter into some rental housing near the university, and it worked like a charm.

Gardner left Woodruff's office in defeat. He was sure the smell would last all winter and that no amount of surface cleaning would diminish it. Then it occurred to Gardner that Union Story had elected an ombudsman a couple of years ago to handle just such an employee complaint. Gardner thumbed through the company's phone directory till he found the name of Pete Warren, Union Story's ombudsman. He gave Warren a call and was able to make an appointment to see him the next day.

Warren took notes as Gardner told him the story of the leaking pipe and the persistent smell. After the meeting, Warren walked back to Gardner's office, agreed that the odor was distinct, and promised to do what he could on Gardner's behalf. Warren had no staff to help him with his ombudsman's duties, but somehow he managed to prepare a report and his recommendation by the end of the week. He forwarded these documents to the company's president for review. The president agreed with Warren's recommendations and notified the maintenance crew to carry out Warren's orders without delay. Gardner was given a small conference room to use as an office for the next several days while carpet layers were working in his office, completely replacing the wall-to-wall carpet and pad.

Chuck Grahame looked over the transfer request and shook his head. He was not surprised by Vince William's request to transfer from the San Jose to the White Plains, N. Y. branch of United Electronics. Among all the young sales representatives he supervised, Williams had always seemed the least satisfied with San Jose and the least wrapped up in his career with United. Williams, of course, had never hidden the fact that he practically lived for the weekends; that on the weekends he did what he <u>really</u> wanted to do; and that was to get out of his three-piece suit and play jazz saxophone. Rumor had it that one weekend when Williams was playing at a jazz festival in Berkeley, a New York based jazz group invited him to play with them whenever he was out on the east coast. Ever since he heard that rumor, Grahame had expected the transfer request.

The trouble was that Williams, even without seeming to try, had racked up one of the best sales records in the division. Denying his request would be hard to justify since transfer requests from top performers were supposed to be given priority. Yet Grahame hated to imagine what would probably become of young Vince Williams if his transfer came through: He would probably work at United for no more than a year; quit to join a jazz group and play in second-rate New York clubs; and end up an underpaid studio musician, turning out jingles for radio and TV commercial So, Grahame decided to deny the transfer request, on the grounds that Williams was too valuable a member of their sales team to loose at that time. He expected Williams would be very disappointed and might even use the company's "open door" policy to appeal. But Grahame was pretty sure he could get his boss to side with him on the matter.

Williams <u>was</u> disappointed and asked Grahame to reconsider. When he refused, Williams said he'd appeal. In the next couple days, Williams prepared a letter of appeal and sent a copy to Grahame. Grahame skimmed the letter, but when he noticed who it was addressed to, his heart nearly skipped a beat: Williams had gone over everybody's head and taken his appeal all the way to the top, to the Chairman of the Board of Directors for United Electronics, Alfred Miller. The company's "open door policy allows employees to take their complaints to whatever higher level in the company they feel is necessary in order to get a fair review, but few employees have the temerity to take their cases more than one or two levels over their supervisor's head.

The following day, Grahame got a call from Clifford Fiske, United's west coast regional director. Fiske explained that Alfred Miller had asked him to investigate Williams' appeal, and he needed an appointment with Grahame to talk about it. During their appointment, Grahame tried to explain his concern for Williams' future. Later, Fiske and Williams also had an appointment to talk about the transfer request Finally, Fiske wrote a report and sent it plus a recommendation to Miller for the Chairman's decision. A week later, Vince Williams got a letter from Alfred Miller saying that his transfer had been granted. Grahame also got a letter from Miller. It said that United is known for the concern it shows its employees, but that concern is not shown in paternalism or disrespect for an employee's own career decisions.

31

Appendix B: Protocols Based on Similar Events

Protocol Rated as Predominantly Episodic
(Based on Two Similar Events)

"Story I

The company had used the disability of their employee without informing him that he was classified as such. Hence he was being "stereotyped" in print without his knowledge. Moreover when he found out about it, the personnel officer overreacted and did not use the information to help the employee, since he would be infringing the letter of the law.

Story II

The company was making public the employee's private business. In addition, if that info was considered important it should have been discussed with the employee to find out the effect of the reperation on him and how it would affect his career in the company. The adding of the information to the file caused the employee and the personnel person to overreact, and set up an embarrassing situation to both of them.

In both stories the personnel person did not bother to either help correct the situation or to find out what happened to the employee after the incident."

Protocol Rated as Categorical
(Based on Three Similar Events)

"In each story IDEM employees came into the Personnel Office to examine their files. After reading their files they became upset because the files contained information they considered personal which they did not want others in the company to know about. In the first case it concerned a wage garnishment, the second an insurance beneficiary designation, and the last, a handicapped status classification.

Each time the Personnel Manager assured the employee that the Personnel File was kept separate from a work-related file and that no information from the Personnel File would be released without specific approval from the employee. They seemed satisfied with that explanation.

Later, when other company employees called to request information, the Personnel Manager explained that he could not release it to them. In the first situation the information might have jeopardized a promotion, in the 3rd case it could have helped secure a transfer, in the 2nd it wouldn't have mattered much."

Protocol Rated as Hypothetical
(Based on Four Similar Events)

"A sincere, conscientious personnel officer continually dealt with employee's anger over very personal information that the company kept in its files by stating that nobody would see it but the employee and himself. In each case, a request was made for the information from within the company and it was refused. In one case, providing the information would clearly have been to the benefit of the employee involved.

In refusing to give out the information considered to be detrimental by the emplo,ee, the personnel officer may have confirmed its existence inadvertantly, however. Also, the employees, not being sure who really had access to it, may have been defensive about it in interview situations and thereby brought it to the attention to the person he least wanted to know (at least suspicious, and again inadvertantly). Finally, the question is left of why the information is maintained in the first place if it is not supposed to be used by anybody."

Appendix C: Protocols Based on Dissimilar Events

Protocol Rated as Hypothetical
(Based on Three Dissimilar Events)

"The three stories involve an employee who is experiencing a conflict between his job and a strong personal characteristic. The personal characteristic is inflexible in resolving or reducing the conflict. It is a portion of the employee, which can not be changed. Therefore, the company is requested to adapt to the employee's needs.

The company's representative is trying to resolve the conflict by ignoring the employee's unique characteristics and forcing him to conform his norms. The Rep's concerns lie in his inability to cater to the employee's unique needs, without applying them to others which in turn may result in a loss of control."

Protocol Rated as Hypothetical
(Based on Three Dissimilar Events)

" Before making decisions on taking actions these people didn't look at all possibilities, didn't think about all possible causes, alternatives or influences about the information that one must have before making decisions or judgements.

Before starting to imagine and to "build castles" around a thought, idea or facts these people didn't reach for all available information that were available.

People were afraid of establishing a better communication, even that they were only hurting themselves.

Also it is remarkable the influence of the environment (family, company etc.) on the behavior of the individuals. Sometimes they have to be pushed."

Protocol Rated as Hypothetical
(Based on Four Dissimilar Events)

"In all cases, the problem "finding" phase was handled in inept manners. The decisions made and implemented were not based on a thorough analysis of defining the problem. Action taken was based on pre-conceived ideas, other people's value system, selfishness, etc., and not on factual information on what was best for each individual involved."